EPA vs FDA Action Levels for Mercury in Fish

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Why do we use the more restrictive EPA screening value of 0.30 mg/kg for fish consumption advisories instead of the less restrictive FDA action level of 1.0 mg/kg?

Where is the 0.30 mg/kg screening value used in the fish mercury data review and fish advisory process?

Definitions

- Screening Value (SV) = 0.30 mg/kg
  - Concentration of mercury in fish which warrants further investigation.
  - UDOH action level or level of concern.

- FDA action level for mercury in fish = 1 mg/kg
  - An action level is an administrative guideline that defines the extent of contamination at which FDA may regard food as adulterated and represents the limit at or above which FDA may take legal action to remove products from the marketplace.

FDA’s Mercury Action Level

- It is important to emphasize that FDA’s jurisdiction in setting action levels is limited to contaminants in food shipped and marketed in interstate commerce, not food that is caught locally by recreational or subsistence fishers.

- In 1979, the FDA established an "action level" of 1.0 part per million (ppm) to regulate methylmercury in commercial fish.

FDA's Mercury Action Level

- The underlying assumptions used in the FDA methodology were never intended, as local fish advisories are, to be protective of recreational, tribal, ethnic, and subsistence fishers who typically consume fish and shellfish from the same local water bodies repeatedly over many years.

- EPA and FDA have agreed that the use of FDA action levels for the purposes of making local advisory determinations is inappropriate.

- Furthermore, it is EPA's belief that FDA action levels and tolerances should not be used as a basis for establishing a state's methylmercury criterion.

Definitions

- Reference Dose (RfD) = 0.0001 mg/kg/day
  - An estimate of a daily exposure to the human population (including sensitive subpopulations) that is likely to be without a risk of adverse effects when experienced over a lifetime.
  - RfD used to calculate screening value (UDOH action level) and consumption rates.
  - Consumption rates are then used to calculate consumption limits.

Definitions

- Consumption Rate
  - maximum allowable fish consumption (kg/day)

- Consumption Limits
  - maximum allowable fish consumption in meals per month
  - number used in state fish consumption advisories

Screening Value

SV = [(RfD)(BW)]/CR

SV = Screening Value for mercury (mg/kg or ppm)
RfD = Reference Dose (Hg = 0.0001 mg/kg/day)
BW = Body weight (70 kg)
CR = Mean daily consumption (0.025 kg/day)

UDOH (EPA) SV for mercury is 0.30 mg/kg (ppm)

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Consumption Rate

$CR_{lim} = [(RfD)(BW)]/C_m$

CR_{lim} = Maximum allowable fish consumption (kg/day)
RfD = Reference Dose (Hg = 0.0001 mg/kg/day)
BW = Body weight (70 kg for adults, 16 kg for children)
C_m = Measured concentration of mercury in fish (mg/kg)

Based on the measured concentration and body weight, the CR_{lim} is the maximum consumption rate allowable without human health effects.

Consumption Limits

$CR_{mm} = [(CR_{lim})(T_{ap})]/MS$

CR_{mm} = Maximum allowable fish consumption (meals/month)
CR_{lim} = Calculated (kg/day)
T_{ap} = Time averaging period (30.44 days/month)
MS = Meal size (0.227 kg fish/meal for adults, 0.113 for children)

Based on the consumption rate limit and meal size, the CR_{mm} is the maximum allowable meals per month without adverse human health effects.

FDA/EPA Recommendations

For women and children to receive the benefits of eating fish and shellfish, they should follow these 3 recommendations:

1. Do not eat Shark, Swordfish, King Mackerel, or Tilefish.
2. Eat up to 12 oz/week of a variety of low mercury fish such as: shrimp, canned light tuna, salmon, pollock, and catfish.
3. Check local advisories for fish from local lakes, rivers and coastal areas.

Final 2007 mercury in fish report can be found at www.health.utah.gov/enviroepi

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